

Claims

1. An repeated pattern layer for a pixellated light modulating device having a plurality of switching regions within each repeat, wherein each switching region is arranged to impart one of at least two predetermined electro-optic characteristics to a light modulating medium wherein the regions are arranged such that any pixel area of the repeated pattern layer above a certain size contains regions of each electro-optic characteristic in substantially the same relative proportion as any other pixel area.
2. A repeated pattern layer as claimed in claim 1 wherein the switching regions are arranged in a repeat unit as a two dimensional grid.
3. A repeated pattern layer as claimed in claim 2 wherein the grid is arranged such that the switching regions are varied in both of said two dimensions.
4. A repeated pattern layer as claimed in claim 3 wherein grid is arranged such that any line through the grid substantially parallel to one of the grid dimensions intersects substantially the same proportion of regions of each electro-optic characteristic.
5. A repeated pattern layer as claimed in claim 3 wherein the grid may be formed by a regular array of switching areas arranged in rows and columns and wherein each row and each column contains one or more of switching areas of each electro-optic characteristic in the same proportion.
6. A repeated pattern layer as claimed in claim 5 wherein the relative numbers of regions of areas of each characteristic in each row and column are weighted with respect to each other.
7. A repeated pattern layer as claimed in claim 5 wherein each row and column contains one area of each electro-optic characteristic.

8. A repeated pattern layer as claimed in claim 2 wherein the grid has a repeat unit that is rectangular.
9. A repeated pattern layer as claimed in claim 1 wherein the repeated pattern layer comprises an alignment layer for a liquid crystal device.
10. A repeated pattern layer as claimed in claim 9 wherein the different electro-optic characteristic is a different alignment direction.
11. A repeated pattern layer as claimed in claim 10 wherein the proportion of switching areas having a first alignment direction is significantly greater than the proportion of switching areas having a different alignment direction.
12. A repeated pattern layer as claimed in claim 9 wherein each switching region having a different switching characteristic comprises an alignment grating having a different grating property.
13. A repeated pattern layer as claimed in claim 12 wherein the different grating property is pitch of the grating.
14. A repeated pattern layer as claimed in claim 12 wherein each alignment grating is a zenithally bistable liquid crystal alignment grating.
15. A light modulating device comprising a cell containing a light modulating medium, the cell having a plurality pixel areas wherein the cell comprises an repeated pattern layer according to claim 1.
16. A light modulating device as claimed in claim 15 wherein the light modulating medium is a liquid crystal material.
17. A light modulating device as claimed in claim 16 wherein the patterned layer is located between a liquid crystal alignment layer and the device electrodes and wherein the patterned layer comprises a dielectric layer wherein each

switching regions has a different dielectric property so as to alter the voltage applied to the liquid crystal material.

18. A light modulating device as claimed in claim 17 wherein the different dielectric property is thickness and/or dielectric constant of the dielectric material.
19. A light modulating device as claimed in claim 15 wherein the patterned layer comprises a layer of retardation films and the differing electro-optic characteristic of the switching areas is the orientation of the retardation axis and/or the magnitude of retardation.
20. A method of fabricating a light modulating device comprising the steps of;

forming a patterned layer having a plurality of switching regions, wherein each switching region is arranged to impart one of at least two predetermined electro-optic characteristics to a light modulating medium and wherein the switching regions are arranged such that any pixel area on the patterned layer above a certain size comprises switching regions of each switching characteristic in substantially the same relative proportion as any other pixel area, and

combining said patterned layer in a cell comprising a light modulating medium and a plurality of electrodes forming a plurality of pixel areas wherein said combination step does not involve a mask alignment step.
21. A method according to claim 20 wherein the light modulating device is a liquid crystal device.
22. A method according to claim 21 wherein each switching region has an alignment grating and wherein the properties of the grating are varied in order to impart the various electro-optic characteristics.

23. A method according to claim 22 wherein the property of the grating varied in the different alignment regions is the grating pitch.
24. A method according to claim 22 wherein the method of forming the alignment layer comprises embossing a master grating bearing a negative of the required alignment layer into a conformal layer and curing the conformal layer.